CLAIMS

1. An optical alignment system for use in a semiconductor processing system, comprising:

a wafer chuck having an alignment feature integrated into a top surface of the wafer chuck;

a beam-forming system disposed above the wafer chuck, the beam-forming system capable of emitting an optical signal onto the alignment feature; and

a detector capable of detecting an amplitude of the optical signal emitted onto the alignment feature.

2. An optical alignment system as recited in claim 1, wherein the alignment feature is a reflective alignment feature capable of reflecting a portion of the optical signal to the beam detector.

3. An optical alignment system as recited in claim 2, wherein the reflective alignment feature is a polished region of the top surface of the wafer chuck.

4. An optical alignment system as recited in claim 3, wherein the polished region is contiguous.

5. An optical alignment system as recited in claim 3, wherein the polished region is a pattern of polished sub-regions.

6. An optical alignment system as recited in claim 1, wherein the alignment feature is a transmittance alignment feature capable of allowing a portion of the optical signal to pass through the wafer chuck to the detector.

7. An optical alignment system as recited in claim 6, wherein the detector is disposed below the wafer chuck.

8. An optical alignment system as recited in claim 6, wherein the transmittance alignment feature is transparent.

9. A method for optical alignment in a semiconductor processing system, comprising the operations of:

emitting an optical signal onto an alignment feature integrated into a wafer chuck, the alignment feature located at a center of the wafer chuck;

detecting an amplitude of the optical signal emitted onto the alignment feature; and

adjusting a beam-forming system to maximize an amplitude of the detected optical signal, the beam-forming system generating the optical signal.

10. A method as recited in claim 9, wherein the alignment feature is a reflective alignment feature that reflects a portion of the optical signal to a detector located with the beam-forming system.

11. A method as recited in claim 10, wherein the reflective alignment feature is a polished region of the top surface of the wafer chuck.

12. A method as recited in claim 11, wherein the polished region is contiguous.

13. A method as recited in claim 11, wherein the polished region is a pattern of polished sub-regions.

14. A method as recited in claim 9, wherein the alignment feature is a transmittance alignment feature capable of allowing a portion of the optical signal to pass through the wafer chuck to the detector.

15. A method as recited in claim 14, wherein the detector is disposed below the wafer chuck.

16. A method as recited in claim 15, wherein the transmittance alignment feature is transparent.

17. A system for aligning a robot arm for use in a semiconductor processing system, comprising:

a wafer chuck having an alignment feature integrated into a top surface of the wafer chuck, the alignment feature located at a central location of the top surface of the wafer chuck;

a beam-forming system disposed above the wafer chuck, the beam-forming system capable of emitting an optical signal onto the alignment feature;

a robot alignment wafer having a reference pattern disposed in a central location of the robot alignment wafer, the robot alignment wafer being disposed on a robot arm; and

a detector capable of detecting an amplitude of the optical signal emitted onto the reference pattern.

18. A system as recited in claim 17, wherein the reference pattern alters the optical signal such that a center of the robot alignment wafer can be determined relative to a center of the wafer chuck.

19. A system as recited in claim 18, wherein the reference pattern is a circular spectral reference pattern having a plurality of bandpass filters in separate segments of the circular spectral reference pattern, each bandpass filter centered at a unique wavelength.

20. A system as recited in claim 18, wherein the reference pattern is a linear aperture pattern having a plurality of circular apertures in a line along a direction of travel of the robot arm when the robot arm inserts the robot alignment wafer into a processing chamber.

21. A system as recited in claim 20, wherein the reference pattern is a mutli-line linear aperture pattern having a plurality of linear aperture patterns, each linear aperture pattern further including a bandpass filter centered at a unique wavelength.